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Notes on Leptothorax bradleyi Wheeler and L. wheeleri M. R. Smith (Hymenoptera: Formicidae) [1]

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Distributional data published up to the present for the closely related species *Leptothorax bradleyi* and *L. wheeleri* have outlined ranges which appeared to be mutually exclusive. When I recently examined specimens of this complex from two localities in Alabama, I considered that they might approach intergrades between the two species, thus indicating that the two were actually subspecies. However, when representative specimens were borrowed from most of the collections which have been made of these forms, it was quickly established that the Alabama material was typical *bradleyi*. Furthermore, the ranges of the two species were found to overlap through at least three states, definitely establishing them as distinct species. The following paper consists of the new distributional data and additional significant descriptions.

Workers of the two species are most easily distinguished on the basis of sculpturing, but they also differ in alitrunk profile, in proportions of the propodeal spines, and in size. In the descriptions given below only the characters useful in comparison are emphasized.

Leptothorax wheeleri M. R. Smith preocc. = miniatus n.n.

L. wheeleri M. R. Smith, Ann. Ent. Soc. Amer., Vol. 22, p. 547, fig. 1 (1929). Workers and queens.

Worker. Ten workers representing all available records showed the following measurements: alitrunk length 0.90 mm.–1.13 mm., mean 1.04 mm.; head length 0.83 mm.–1.02 mm., mean 0.91 mm.; distance between the tips of the propodeal

[1] Appreciation is expressed to Dr. M. R. Smith, Dr. Arnold Van Pelt, Dr. A. C. Cole, and Mr. H. T. Vanderford for the loan of most of the material used in this study.

spines 0.28 mm.–0.37 mm., mean 0.30 mm.; length of propodeal spines 0.17 mm.–0.22 mm., mean 0.18 mm. (All measurements with maximum error of ±0.01 mm.) Alitrunks were measured in profile from the dorsal base of the pronotal collar to the dorsum of the junction with the petiole; heads were measured in profile from the anterior edge of the clypeus to the extreme occipital border.

Dorsum of head covered by longitudinal rugae, the interspaces coarsely punctate; the rugae extend forward past the fronto-clypeal suture as the clypeal carinae. Alitrunk coarsely rugo-reticulate. Petiole with distinct rugulae, fainter than those of the alitrunk. Postpetiole with a few faint rugulae, the interspaces punctate, the surface opaque.

Alitrunk arcuate in profile, rising to its highest point at the pronotum.

Localities. Specimens were examined from the following localities: Mississippi State College (M. R. Smith); Starkville, Miss. (M. R. Smith); War Trace, Tenn. (H. T. Vanderford); Greenbriar Cove, Great Smoky Mts. Nat. Park, Tenn. (A. C. Cole); Wilmington, N. C. (H. T. Vanderford); Dalton, Ga. (H. T. Vanderford); Gainesville, Fla. (T. H. Hubbell). Smith also recorded this species from Adaton, Miss., and L. G. and R. G. Wesson recorded it from South Central Ohio (Amer. Mid. Nat., Vol. 24, p. 96).

Leptothorax bradleyi Wheeler

L. bradleyi Wheeler, Psyche, Vol. 20, p. 113 (1913). Holotype worker.

Worker. Ten workers representing all of the available records showed the following measurements: alitrunk length 0.83 mm.–0.93 mm., mean 0.89 mm.; head length 0.70 mm.–0.80 mm., mean 0.74 mm.; distance between the tips of the propodeal spines 0.25 mm.–0.28 mm., mean 0.27 mm.; length of the propodeal spines 0.08 mm.–0.15 mm., mean 0.13 mm.

Alitrunk evenly flattened in profile.

Sculpturing of the head similar to that in *L. wheeleri.* The entire mesonotum except for the margins finely rugulo-reticulate, giving a granulose appearance at magnifications of 36 × and less.

The posterior edge of the pronotum similar to mesonotum, but the anterior half rugo-reticulate. This reticulum merges with the posterior rugulo-reticulum, and the latter decreases in size anteriad until its interspaces are distinguished only as broad punctures within the coarser, anterior reticulum. The margins of the mesonotum longitudinally rugose. The reticulum of the basal face of the propodeum fades posteriad into coarse punctulation. The petiole punctate, opaque; sculpturing of the postpetiole irregular, with very shallow punctures, feebly shining to subopaque.

The colorations of *L. bradleyi* and *L. wheeleri* are nearly identical, a rich ferruginous red. In most of the *bradleyi* workers examined the posterior margins of the gastric segments are distinctly infuscate; this condition is absent in *wheeleri.*

Queen. Alitrunk length 1.33 mm.; head length 0.86 mm. Differing from the worker in the usual characters separating these two castes, in sculpturing, and in proportions of the propodeal spines. Mesonotal scutum and scutellum evenly flattened in profile, the posterior third of the scutellum sloping downward somewhat. The propodeal spines blunt and dentiform. Notaulices and parapsidal furrows absent.

Head covered by relatively coarse, longitudinal rugae (approximately thirty would be cut by a line drawn transversely across the center of the head); rugae variable in size, frequently anastomosing; the interspaces punctate. Central portion and collar of pronotum granulose, the pleural arms rugoreticulate, with the two zones of sculpturing meeting abruptly. Mesothoracic scutum and epipleurites with finer, more evenly longitudinal rugae (approximately forty would be cut by a line drawn transversely across the center of the scutum). Scutellum with smaller, less regular, and indistinct rugae. Anterior margin of the propodeum rugose, the remainder granulose. Sides of the alitrunk mostly granulose, with a few marginal rugae. Petiole and postpetiole with numerous shallow, confluent punctures and a few indistinct longitudinal rugae; their surfaces feebly shining. The gaster without sculpturing, glabrous.

This queen differs very little from the cotype queen of *L.*

wheeleri loaned to me by Dr. Smith. It can be distinguished from Smith's specimen on the basis of the following characters: distinct transverse rugae present between the propodeal spines in *wheeleri,* absent in *bradleyi;* petiole and postpetiole opaque in *wheeleri,* feebly shining in *bradleyi*; propodeal spines fairly well developed in *wheeleri,* dentiform in *bradleyi*; and smaller size of *bradleyi.* Otherwise the two closely resemble one another in sculpturing, flattening of the alitrunk, infuscation of the posterior margins of the gastric segments (absent in *wheeleri* workers), and general habitus under low magnification. This convergence of characters seems to indicate that the queen caste has diverged more slowly than the worker caste. If this is true, it appears that the *bradleyi* worker more closely approaches the ancestral form, in weaker sculpturing, flattening of the alitrunk, coloration, etc.

Male. Alitrunk length 1.23 mm.; head length 0.52 mm. Antennae 12-jointed, with the funicular segments gradually diminishing in size distally and not forming a distinct club. Notaulices (Mayrian Furrows) present and distinct, converging directly behind the center of the mesonotum. Wings with greatly reduced venation, the following veins occurring in the forewing: Sc + R, R_1, Rsf_1, Rs + M, Rsf_5, Mf_1, M +CuA, A, cu-a. Mf_5, CuA, and A distad to cu-a present but faded and indistinct. In one of the two specimens examined a small crossvein (2r?) extends from Rsf_5 almost to the stigma. (See BROWN and NUTTING, Trans. Amer. Ent. Soc., Vol. 75, pp. 113–132, for a discussion of homology.) Hindwing with two very faint, basal abscissae. Costal, median, submedian, and cubital cells present in the fore wing; discoidal cell absent.

Most of head covered by longitudinal rugulae, the interspaces punctate, a condition approaching that of the worker; rugae of occiput indistinct, with a transverse trend. Most of the alitrunk covered by longitudinal rugulae, but these are finer and more closely set than those of head; interspace punctulations not apparent. Propodeum covered by shallow, confluent punctures. Petiole, postpetiole, and gaster shining, largely free from sculpturing. All of body except appendages jet black. Scape and

femora dark brown; funiculus and distal portion of legs light brown. Wings faintly iridescent.

Localities. Specimens were examined from the following localities: Bay Minette, Ala. (E. O. Wilson); Tuscaloosa, Ala. (E. O. Wilson and Ben Sanders, Jr.); Hoschton, Ga. (H. T. Vanderford); Gainesville, Fla. (A. Van Pelt); Lake Placid, Fla. (T. C. Schneirla). The type locality is Billy's Island, Okefenokee Swamp, Ga.

Knowledge of the biology of the two species is limited at present to scanty nesting data. Smith found the several colonies comprising the type series of *L. wheeleri* in crevices and cavities of solid deciduous trees and under the bark of rotten pine stumps. Hubbs found his Florida *wheeleri* in galleries in a stick of solid pine firewood. The Wessons (Amer. Mid. Nat., Vol. 24, p. 96) found this species "in galleries in the hardened, weathered logs on old deserted and tumbledown log cabins exposed to the sun. Two other colonies were found on large oak trees where they were nesting in dead stobs." Most of the other specimens of both species have been collected as strays. My two colonies of *L. bradleyi* were found by chipping away the thick bark of living pines. Both were in flat, well defined galleries in the bark about three to five feet above the ground. The Tuscaloosa nest was carefully dissected, and what probably represents the bulk of the colony was collected; this contained one dealate queen, 42 workers, two males, and a small number of worker larvae and pupae.